

REMARKS

Applicant appreciates the Examiner's thorough examination of the present application as evidenced by the Office Action mailed August 27, 2010 ("Office Action"). In response, Applicant has amended independent Claims 1, 16, and 20 have been amended to incorporate the recitations of dependent Claims 2, 17, and 21, which have been canceled without prejudice or disclaimer, to clarify that a determination is made that the sound signal comprises speech when the sound signal emanates from a first range of directions and a determination is made that the sound signal does not comprise speech when the sound signal emanates from a second, different range of directions. When the sound signal emanates from the second, different range of directions, no frequency spectral processing of the sound signal is performed. The first range of directions is in a direction of an intended user's mouth and/or is adjustable. Support for these claim amendments can be found, for example, in the Specification on page 5, lines 4 – 12. Various dependent claims have been amended to correct their dependencies in light of the cancellation of Claims 2 and 21. Independent Claim 16 has also been amended to address the Section 101 rejection.

Applicant respectfully submits that the cited references fail to disclose or suggest, at least, all of the recitations of the pending independent claims as amended. Accordingly, Applicant submits that all pending claims are in condition for allowance. Favorable reconsideration of all pending claims is respectfully requested for at least the reasons discussed hereafter.

Section 101 Rejections

Claims 20 – 23, 25, and 26 stand rejected under 35 U.S.C. §101 as allegedly not passing the machine or transformation test. (Office Action, pages 2 and 3). According to the "machine-or-transformation" test, a method claim is eligible for patent protection under 35 U.S.C. § 101 if the claim is tied to a particular machine or if the claim transforms a physical article into a different state or thing. In Re Bilski (Fed Cir. 2008). Independent Claim 20 has

been amended to state that at least a portion of one of the method operations is performed on at least one processor. Independent Claim 20, as amended, and the claims that depend therefrom are tied to a processor, which qualifies as a machine under the Bilski test. Accordingly, Claim 20 and the claims that depend therefrom qualify as statutory subject matter under 35 U.S.C. §101.

Section 103 Rejections

Independent Claims 1, 16, and 20 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U. S. Patent No. 5,917,944 to Wakisaka et al. ("Wakisaka") in view of U. S. Patent No. 5,848,170 to Mahieux et al. ("Mahieux"). (Office Action, page 4). Independent Claim 1 is directed to a device for voice activity detection and recites, as amended, in part:

a sound signal analyser configured to determine whether a sound signal comprises speech, comprising:

a microphone system configured to discriminate sounds emanating from sources located in different directions from the microphone system, wherein the microphone system is configured to determine the direction of a sound source causing a sound signal, is configured to further analyse the sound signal to determine whether the sound signal comprises speech when the sound signal emanates from a first range of directions, and is configured to determine that the sound signal does not comprise speech and perform no frequency spectral processing of the sound signal when the sound signal emanates from a second, different range of directions;

wherein the first range of directions is directed in a direction of an intended user's mouth. (Emphasis added).

Independent Claims 16 and 20 include similar recitations. According to the pending independent claims, the direction of a sound source is determined first. If the sound emanates from a first range of directions, then the then the sound is further analyzed to determine if the sound comprises speech. If the sound emanates from a second range of directions different from the first, then it is determined that the sound does not comprise speech and no frequency spectral processing of the sound signal is performed. Thus, based on the direction from which a sound emanates, the sound can be ruled out as being speech. Only sounds emanating from a certain set of directions are analyzed to determine whether they are actually speech—

no frequency spectral processing is performed on sound signals emanating from other directions. As a result, some embodiments of the present invention may allow sound that emanates from some place other than a user to be discarded by voice activity processors.

Wakisaka discloses a voice recognizing and translation system for recognizing detected voices and translation the voices into words or sentences (Wakisaka col. 8, lines 16 – 23), including a voice memory for storing voice data representing the detected voice (Wakisaka, col. 13, lines 4 – 20) and a noise detection unit for removing or deleting data corresponding to noise among others (Wakisaka, col. 13, lines 4 – 20). The system also includes a single directional microphone used to reliably collect a particular desired voice signal (target voice) and a multidirectional microphone used to collect the overall ambient sound (various sound containing surrounding voices and noises) (Wakisaka, col. 12, lines 31 - 45). The multidirectional microphone is used to remove surrounding noise from the voice signal, which is announced in an airport or train station, for example.

In sharp contrast to the recitations of the pending independent claims, however, Wakisaka does not appear to include any disclosure or description of ruling out sound as comprising speech based on the direction from which the sound emanates and only analyzing sounds to determine if they comprise speech if they emanate from particular directions. That is, unlike the recitations of the pending independent claims, Wakisaka teaches that the **sound signals from all directions are spectrally processed** and undesired voices and noises, including speech, are removed. The independent claims state that only sound emanating from a first range of directions is further analyzed as this sound may comprise desired speech. Sounds emanating from other directions are not spectrally processed as it is presumed not to comprise desired speech. One effect of this difference is that it may only be necessary to use one voice activity detector throughout the whole signal path. This may in turn reduce the computational complexity, thereby decreasing the load on the signal processors as well as improving the performance. It may be especially favorable in environment with high background noise and noise with similar spectral properties as speech.

The secondary reference, Mahieux, discloses an acoustic antenna for computer workstations, which is used for video conferencing and comprises a plurality of microphones

connected to a summator circuit. (Mahieux, Abstract). Mahieux fails to disclose or suggest the teachings described above missing from Wakisaka.

For at least the foregoing reasons, Applicant respectfully submits that independent Claims 1, 16, and 20 and that the dependent claims are patentable at least per the patentability of the independent claims from which they depend.

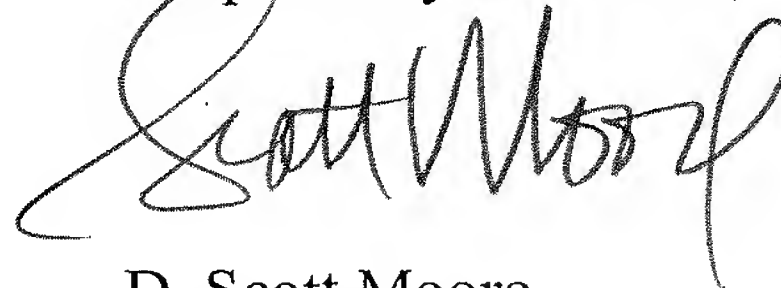
Dependent Claims Are Patentable

As each of the dependent claims depends from a base claim that is believed to be in condition for allowance, Applicant does not believe that it is necessary to argue the allowability of each dependent claim individually. Applicant does not necessarily concur with the interpretation of these claims, or with the bases for rejection set forth in the Office Action. Applicant therefore reserves the right to address the patentability of these claims individually as necessary in the future.

CONCLUSION

In light of the above amendments and remarks, Applicant respectfully submits that the above-entitled application is now in condition for allowance. Favorable reconsideration of this application, as amended, is respectfully requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (919) 854-1400.

Respectfully submitted,



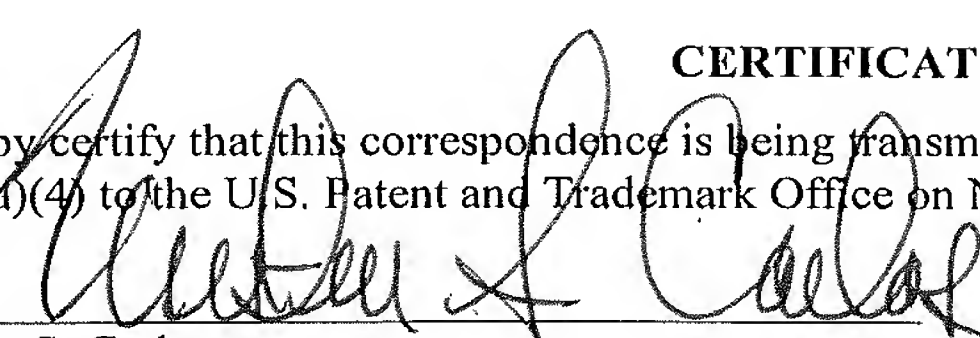
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CERTIFICATION OF TRANSMISSION

I hereby certify that this correspondence is being transmitted via the Office electronic filing system in accordance with § 1.6(a)(4) to the U.S. Patent and Trademark Office on November 29, 2010.


Kirsten S. Carlos